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# The Citrus Industry

THE ONLY PUBLICATION IN THE WORLD  
DEVOTED EXCLUSIVELY TO CITRUS FRUITS

*Issued Monthly*  
Representative of every interest—  
Representing no special interest.

VOL. 2

JANUARY, 1921

NO. 1

Some of the important citrus troubles are shown on the Grapefruit leaf used as our trade mark. At left is the adult White Fly, next the Rus' Mite, near the tip the Purple Scale, and in upper middle the disease known as Scab of Grapefruit. All but Scab are shown more or less enlarged.

RECEIVED  
JAN 21 1921

U. S. Department of Agriculture



## FICO INSECTICIDES

Mix With Hard Water

**FICO 60**--For White Flies and Scale Insects, can be used with Lime-Sulphur.

**FICO 20**--For Cottony Cushion Scale and Mealy Bugs.

**LIME-SULPHUR SOLUTION**--For Spiders, Mites and Scab.

**FICO-SULFUR**--For same purpose as Lime-Sulphur Solution.

Cut Out Spray Troubles by Using Fico Insecticides

### Florida Insecticide Company

Apopka and Haines City, Florida

# **If You Expect to Build NOW IS THE TIME**

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Building Materials--Stone,  
Sand, Cement, Lime and Tile.

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Limestone, Lake Weir Sand,  
Mineral Filled Sewer Pipe.

**Concrete Mixers Carried in Stock.**

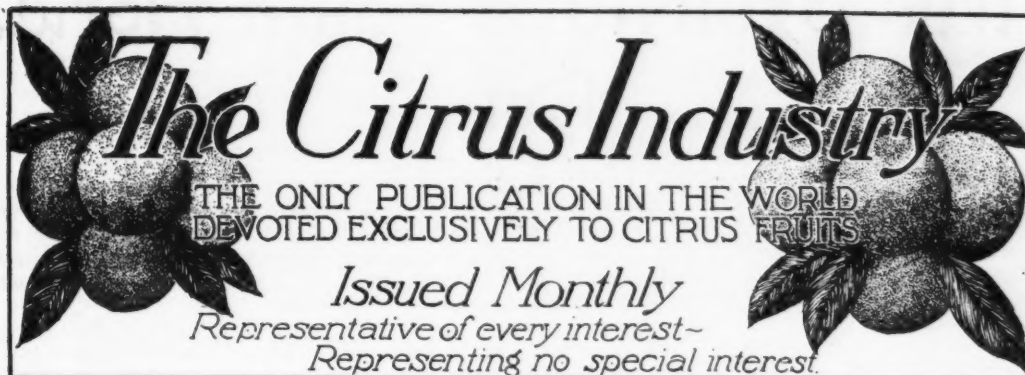
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"Persian Mingled Shades"

## **W. R. FULLER**

**Tampa, Florida**



Vol. 2

JANUARY, 1921

No. 1

## forests Affect Climate and Rainfall

### U. S. forest Economist Raphael Zon Approves Reforestation Movement

Since the publication in the November issue of The Citrus Industry of an article by Mr. P. L. Waycoup on "The Relation of Deforestation to Citrus Culture in Florida," this magazine has received many communications and heard many comments on the timeliness of the subject. The matter has received the attention of many timber and naval stores operators and has attracted wide attention among citrus growers.

The following letter from Mr. Raphael Zon, Forest Economist in the U. S. Department of Agriculture, shows that the Federal Forest Service also is giving attention to this subject, not only as it affects the Florida citrus grower, but in its broader scope of national importance.

Mr. Zon's letter is appended herewith:

United States Department of Agriculture  
Forest Service  
Washington, D. C., January 6, 1921.  
Mr. S. L. Frisbie,  
The Citrus Industry,  
Curry Bldg., Tampa, Florida.

Dear Sir: A copy of The Citrus Industry, containing an article by P. L. Waycoup on "The Relation of Deforestation to Citrus Culture in Florida," has come to my attention. I have read Mr. Waycoup's article with much interest. It strikes me that his observations are very well founded.

Forests have unquestionably an effect upon the local climate and their value as windbreaks for orchards and crops is thoroughly established. I take the liberty of sending you a copy of Farmers' Bulletin 788, "The Windbreak as a Farm Asset." Unfortunately, the larger bulletin (Forest Service Bulletin 86), entitled "Windbreaks, Their Influence and Value," is no longer available for free distribution. It can, however, be purchased from the Superintendent of Documents, Washington, D. C., for 30 cents in coin or money order.

It seems to me that the forests of the entire coastal plain have not only an important effect upon the local climate but must influence the humidity and the temperature of even such distant regions as the central and prairie states. I have attempted to work out this influence in an article entitled "The Relation of Forests in the Atlantic Plain to the Humidity of the Central States and Prairie Region" in the Proceedings of the Society of American Foresters, a copy of which I am sending you under separate cover.

On a whole, Mr. Waycoup has touched on a subject which is of immense interest to me and I was keenly delighted in reading it.

Very truly yours,

RAPHAEL ZON,  
Forest Economist.



# Citrus Exhibits at South Florida fair

By Frank L. Huffaker

Second in interest and information-giving displays of agricultural, horticultural, live stock, home demonstration work, industrial and other products to no semi-tropic exposition held in the world is the annual South Florida Fair and Gasparilla Carnival, the next of the series of which will be held in Tampa, February 3 to 12 of the present

are granted by all railroads and steamboat lines, and Tampan make special preparations for housing and feeding guests who overflow the hotel and apartment house capacity of the city.

## Magnificent Citrus Exhibit

Although Florida has advanced wonderfully in staple crop and live stock production in recent years, in-

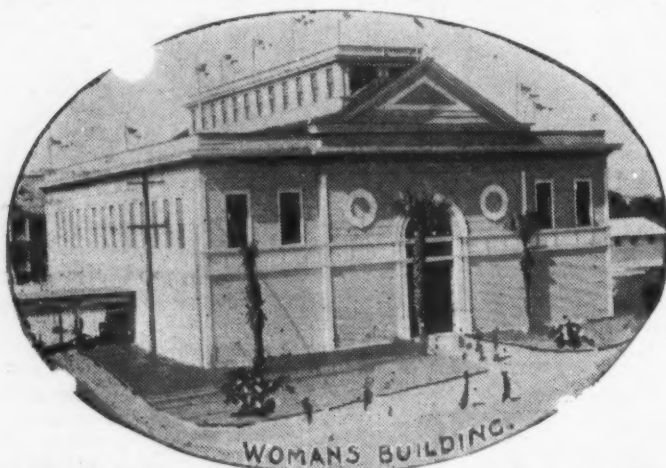
come grove-owners when the profitability of the industry under present-day methods of cultivation, packing, shipping and marketing is made evident.

Florida citrus fruits have for generations been noted for their palatableness and health-giving qualities, but for many years methods of handling the "golden globules" were past-date in character. During the past decade, however, wonderful progress has been shown, groves have been increased in number and size in all counties of the Citrus Belt, and the era of citrus development has just begun.

## Increasing Premium Offerings

Although without state support financially and conducted on the non-profit-making basis, the Fair Association annually offers increased premiums for county and individual grove exhibits of citrus fruits and also arranges for lectures and conferences that increased interest in modern methods of cultivation, packing and marketing.

No section of the world produces fruits of the citrus type in greater variety and with more ease than Southern and Central Florida, and experimenters frequently announce the production of new-type and in-



year, the Florida-grown and manufactured products of which will be enhanced by those of the Republic of Mexico and the Dominion of Canada.

To the product-exhibiting phase of the Fair which enlightens thousands of tourists and homeseekers as to the fertility and versatility of Florida's soil and climate, and at the same time awakens natives to the soil-produced treasures that have been bequeathed to them, is added the merriment-producing Gasparilla Carnival, founded on the romantic ventures of the Spanish pirate, Gasparilla, on the Florida Gulf coast more than a century ago. This carnival arouses cosmopolitan Tampan, brings out the mardí gras spirit, and inspires pageants and social functions in tourist hotels and American and Latin clubs that are noted throughout the nation for their uniqueness and brilliancy. Then the sporting and other amusements common to fairs and expositions are added, completing the circle from both educational and amusement viewpoints. Low rates from all points in Florida

interest in the State is naturally centered principally in the production of golden citrus fruits in variety after



variety, and these exhibits, from counties and individuals, draw thousands who are attracted to Florida by their consumption of oranges, grapefruit, tangerines and other fruits of the citrus variety for which the State is famed throughout the world, and hundreds of whom be-

creasingly superior fruits. The passage of the slip-shod method period guaranteeing larger and surer profits from fruit production, the number of residents of other states who are either purchasing or establishing groves is growing at a rapid rate—and each Fair adds to the number.

## THE CITRUS INDUSTRY

Although all varieties are not listed in the official premium list of the Fair, the following excerpt from that list gives an idea of what the Florida Citrus Belt is producing in the fruit line generally:

### TROPICAL, CITRUS AND OTHER FRUITS All Exhibits in Boxes Must Be Wrapped, Marked and Packed According to Florida Standard CLASS No. 27 Fruits

Lot		1st	2nd	3rd
163	Best exhibit of Citrus Fruit grown and exhibited by one individual (five or more varieties) . . . . .	\$15.00	\$10.00	\$5.00
164	Best exhibit Fruit other than Citrus, grown and exhibited by one individual (five or more varieties) . . . . .	10.00	5.00	3.00
165	Best box Pineapple Oranges . . . . .	5.00	3.00	1.00
166	Best box Temple Oranges . . . . .	5.00	3.00	1.00
167	Best box Valencia Oranges . . . . .	5.00	3.00	1.00
168	Best box Lue Gim Gong Oranges . . . . .	5.00	3.00	1.00
169	Best box Seedling Oranges . . . . .	5.00	3.00	1.00
170	Best box Parson Brown Oranges . . . . .	5.00	3.00	1.00
171	Best box Navel Oranges . . . . .	5.00	3.00	1.00
172	Best box King Oranges . . . . .	5.00	3.00	1.00
173	Best box Satsuma Oranges . . . . .	5.00	3.00	1.00
174	Best box Oranges other than named . . . . .	5.00	3.00	1.00
175	Best box Tangerines . . . . .	5.00	3.00	1.00
176	Best box Tangelos . . . . .	5.00	3.00	1.00
177	Best six boxes Kumquats . . . . .	3.00	2.00	1.00
178	Best box Grapefruit . . . . .	5.00	3.00	1.00
179	Largest and best bunch Grapefruit . . . . .	3.00	2.00	1.00
180	Best box Lemons . . . . .	5.00	3.00	1.00
181	Best peck Limes . . . . .	5.00	3.00	1.00
182	Best six quart basket Guavas . . . . .	3.00	2.00	1.00
183	Best bunch Bananas (large variety) . . . . .	5.00	3.00	1.00
184	Best bunch Bananas (small) Lady Finger variety . . . . .	5.00	3.00	1.00
185	Best bunch Red Bananas . . . . .	5.00	3.00	1.00
186	Best Banana Plant in fruit . . . . .	3.00	2.00	1.00
187	Best box Pineapples . . . . .	5.00	3.00	1.00
188	Best exhibit Avacados (8 or more) . . . . .	5.00	3.00	1.00
189	Best exhibit Mangoes (8 or more) . . . . .	3.00	2.00	1.00
190	Best exhibit Papaya (six or more) . . . . .	3.00	2.00	1.00
191	Best exhibit Loquats . . . . .	3.00	2.00	1.00
192	Best exhibit of Tropical Fruit other than named above . . . . .	3.00	2.00	1.00
193	Best Japanese Persimmons (12 or more) . . . . .	3.00	2.00	1.00
194	Best exhibit fresh Figs (12 or more) . . . . .	3.00	2.00	1.00
195	Best six Pomegranates . . . . .	2.00	1.00	.75
196	Best six Apples (any variety) . . . . .	2.00	1.00	.75

To these individual offerings are those for citrus-producing counties, which are as follows:

Best exhibit of citrus fruits by a county, five or more competing:

First—\$100 and diploma.

season in Florida, and the type of men and women attracted thereto, the rich Republic of Mexico applied for exhibit space at the coming Fair, necessitating the erection of a special building for that truly remarkable country. The Dominion of Canada also asked for a smaller area of space.

Because of the interest manifested in the movement by the Latin republics of South and Central America and the West Indies directors of the fair association now plan to develop an annual Pan-American and Semi-

Tropic Exposition which will prove one of the marvels of the world in the line of product displays, brilliancy of entertainment and interest of international gatherings.

### CITRUS INDUSTRY ITS BEST

#### FREIGHT CUSTOMER, SAYS P. E.

A recent issue of the Pacific Electric Magazine, published by the employees of the company, is devoted to the activities of the general freight department.

Considerable space is given to a review of the citrus industry. Illustrations are published of the "Sunkist" packing house at San Fernando, of the interior of a citrus packing house with the force in full operation, and another showing the method of conveying the fruit from the packing house to the refrigerator car.

In commenting on the value of the citrus fruit shipments over its lines the writer says:

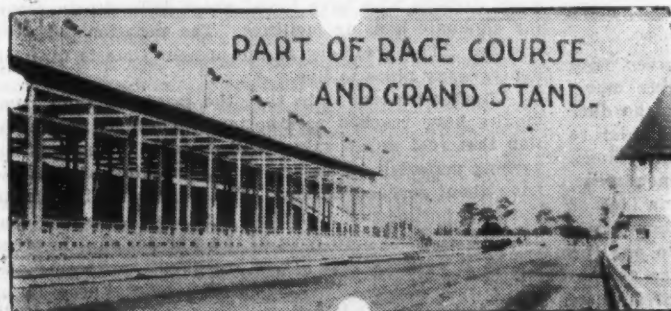
"With the establishment of through transcontinental rates with the Southern Pacific and the Los Angeles & Salt Lake Railroads, a great impetus was given to industrial expansion along lines of this company, the most noticeable being that in the citrus fruit industry. Prior to the existence of through rates in 1913, this company was receiving citrus fruit shipments amounting to approximately 75 carloads per year originated by three of the five packing houses served by its rails, the other two houses then utilizing their outlet with steam line connections.

"During the season of 1914 the citrus shipments amounted to 961 cars and for the season of 1919 increased to 6,391 cars. This remarkable growth in the citrus fruit industry has made it the most important revenue producing factor that the company has from a freight transportation viewpoint."

### Pasco County Will Increase Citrus Yield

Pasco county is fast getting into the citrus game on an extensive scale, as recent operations there clearly indicate. The Dade City Packing Company has outgrown its present quarters and plans have been made to double the capacity of the plant. During the past season this company packed 30,000 boxes of citrus fruits, doubling the shipments of the previous year.

In addition to the enlargement of this plant, a large marmalade factory is to be erected at San Antonio to care for the culls and drops. The latter project is being financed by Michigan capital.



Second—\$50 and diploma.

Third—\$25 and diploma.

Fourth—Diploma for honorable mention.

### Pan-American Exposition

Because of the nation-wide interest in the South Florida Fair and Gasparilla Carnival, the fact that it is held at the height of the winter

# The Citrus Industry

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S. L. FRISBIE, Editor and Manager

## TELEPHONE:

Editorial and Business Office ..... 4819

D. W. HADSELL..... Consulting Pomologist

M. H. ARENDS, Jacksonville Representative  
Room 3, 120 West Adams

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## PRICE INFLATION THROUGH TARIFF

**S**ENATOR PARK TRAMMELL of Florida is a protectionist after our own heart. He is opposed to the republican theory of a high protective tariff, but believes that if the products which citrus growers must buy are to be inflated in price through the operation of a high tariff stimulant, that the citrus growers are entitled to the benefits of the same process of artificial stimulation.

The Citrus Industry does not believe in the policy of artificial price inflation through a high protective tariff. Citrus growers have never been insistent upon a policy of tariff protection for their fruits. They have been content to let the law of supply and demand govern the price and have endeavored to meet each fluctuating price situation as best they could.

But, if the things which citrus growers must buy from the producers of other states are to be "protected" in the effort to create an artificial standard of value, then the citrus grower is entitled to the benefit of that same stimulus—whatever it may be. If corn and wheat, sugar and rice, wool and cotton, are to be forced to higher price levels through the operation of a tariff law, then the citrus grower, who consumes much of the surplus in these lines, is entitled to an equal degree of "protection" for his oranges, his grapefruit, his lemons and his limes.

The Citrus Industry, therefore, fully agrees with Senator Trammell's amendment to the pending emergency tariff bill, to provide for an increase in the duty on oranges, grapefruit, shaddocks and limes, similar to the increase proposed in the pending bill on lemons. Senator Trammell, in connection with his amendment, states that he does not believe in the republican idea of a high protective tariff, but that it would be very unfair to the people of his state for them to have to pay the increased price on what they have to purchase outside of the state on account of a high protective tariff and on the other hand have to sell the products produced in Florida without the advantage in price that may result from such protection. He states that with a republican congress it is inevitable that the policy of the protective tariff will prevail. If we are to have a high protective tariff, Senator Trammell takes the position that the products and industries of his state should have a similar consideration given by a republican congress to the products and the industries of other states. The pending emergency tariff bill provides for an average on wheat

from 10 to 30 cents per bushel; on flour from 45 cents per barrel to 20 per cent on the cost price; corn is advanced from the free list to 15 cents per bushel; on rice the duty is made about double; wool and all articles manufactured from wool are advanced from the free list to a high tariff. These products and articles are purchased largely by the Florida people from other states and they will necessarily have to pay such increased price as may be due to the tariff being placed upon these products and articles by the pending tariff bill.

Senator Trammell states that all he is advocating is that Florida products and industries be given the same consideration that is extended to the other sections of the United States, and says that he will insist upon his amendment and also urge the duty as proposed in the emergency measure on long staple cotton, peanuts and other Florida products be allowed to stand as proposed.

## HUGE HOUSE SHORTAGE

**T**HERE is a shortage of 1,250,000 homes in the United States, and more than 4,000,000 persons are inadequately housed. These figures are contained in an estimate to be submitted to the National Council of the United States Chamber of Commerce by John Ihlder, manager of the civic department, at a meeting to be held in Washington, January 27. The meeting is called to discuss measures to relieve the situation and will be attended by representatives of 1,400 industrial and commercial organizations.

"For a number of years prior to the world war," said Mr. Ihlder, "it is conservatively estimated that between 350,000 and 400,000 dwellings were erected in the United States each year. During the war construction was virtually at a standstill, and the situation has not improved a great deal since the signing of the armistice, except for a brief spurt early in 1919."

In 1919 it was estimated by Mr. Ihlder that there were built only about 70,000 houses in the United States, while the number erected during 1920 will probably total even less than that figure.

The overcrowding of rooms and apartments provides conditions under which infectious diseases spread rapidly, continued Mr. Ihlder, who said that the proposed conference in Washington will consider ways and means of providing individual homes for laborers and the small wage earners who have found great difficulty in securing adequate housing facilities. The situation is a serious one. The great cry at the present time is for residences—any place to live.

Lumber dealers state that the prices of their commodity have reached rock-bottom. There is no indication that real estate values will decrease. The costs of various materials necessary to the building of a house have about reached normal. The wages of labor are in the neighborhood of normalcy, considering the new condition which has been born of the war period. In other words, it appears that prices are about to become stabilized. By the end of 1921, unless a general program of house-building is adopted, the state of affairs will be even more deplorable.

## REFORESTATION IN FLORIDA

**T**HE subject of reforestation in Florida is receiving a great deal of attention at the hands of men and interests which gives promise of much in the way of favorable consideration and aggressive activity.

The discussion of this important subject was first introduced by Mr. P. L. Waycup in an article published



in the November number of The Citrus Industry. This was followed by an address by Dr. J. H. Ross, president of the Florida Citrus Exchange, at a gathering of leading business and professional men from all sections of Florida who were gathered at a barbecue given by Mr. Walter F. Coachman on his estate at Lake Childs. This address also was published in The Citrus Industry of December.

The matter has gained such prominence that it has been taken up and endorsed by the Florida Development Board, which promises the fullest co-operation in the work. The Federal Department of Agriculture, through the Bureau of Forestry, also has taken a hand and given its endorsement to the movement for active reforestation in Florida.

The Citrus Industry considers this matter of reforestation one of the greatest problems with which the citrus growers and other agricultural and horticultural interests of Florida must concern themselves during the next decade.

The belief of the practical grove owner and operator that the forests exert a direct influence upon climatic conditions and rainfall is given the fullest endorsement of the government experts in forestry and climatology. Added to this is the unquestioned influence of forests upon the frequency and destructiveness of storms. Then, too, the destruction of the native forests, oftentimes wanton and in some cases well nigh criminal, has so depleted the timber supply of the state that material for crate and box manufacture is seriously threatened.

Realizing all these important features of the problem, the question of reforestation becomes one of such interest and paramount concern that it is small wonder that the introduction of the subject in the columns of The Citrus Industry has brought to the support of the movement the most influential factors in the state and enlisted the proffered aid of the national department of agriculture in bringing about a successful solution.

The agitation has only begun, and The Citrus Industry firmly believes that the work will be carried on until adequate laws, properly enforced, for the preservation of the remaining forest tracts and the encouragement of new plantings, have been enacted.

### THE RIGHT IDEA

**W**HILE the recent efforts of Florida citrus shippers and growers to get together on a working basis for the betterment of the industry through a lowering of the cost of production and transportation have not been entirely successful, they mark a forward step toward unity of interest which is to be commended and which should be encouraged.

That the cost of producing citrus fruits is far too high, every practical citrus grower will affirm. That the cost of labor, of materials and of transportation are equally too high, is all too evident to the man who must foot the bill.

The difference between marketing fruit at a loss and marketing it at a profit resolves itself into the solution of the problem of reducing the cost of production and transportation.

This problem cannot be solved by any one grower or any one shipper, nor by any one organization of growers or shippers, no matter how strong that organization may be. The solution must come as the result of the united action of all shippers and all growers, whether individuals or organizations.

It is because of the wide representation of these individual growers and shippers, and of organizations repre-

senting growers and shippers, at the several meetings recently held at Leesburg, Orlando and Jacksonville that The Citrus Industry is encouraged to hope for a successful solution of the problem.

Out of the preliminary meetings which have been held, The Citrus Industry hopes to see grow up a statewide organization of citrus men which shall bring into harmonious unity every citrus factor in the state—and it hopes later to see this organization form the nucleus of national organization of citrus interests which will be big enough and broad enough to handle any citrus problem which may arise.

There are plenty of men in the industry who are big enough to promote and maintain such an organization if only they can be brought together.

### THE SOUTH FLORIDA FAIR

**C**ITRUS growers of Florida are deeply interested in the coming South Florida Fair at Tampa, early in February. And well they may be. This exhibition promises to outdo all previous fairs in interest to citrus growers. Not only will the citrus section be more largely represented than ever before, but the variety and quality of the fruits shown also promises to eclipse any former exhibition.

The fair management fully recognizes the importance of the citrus industry in the territory represented by the fair and no effort has been spared in bringing together the greatest exhibit by counties and individuals that has ever been attempted. This effort on the part of the management has been met in the proper spirit by exhibitors. Keen, though friendly, rivalry has been created among the citrus-producing counties, and these through their several county agents have arranged for exceptionally large space for citrus exhibitors. Individual growers, too, have shared this spirit of friendly rivalry and exhibits of this nature will be far greater than ever before.

Added to the exhibits of citrus fruits, the growers will find in the exceptional exhibits of farm and grove and packing house equipment and machinery a still further incentive to attendance upon and participation in the fair.

The South Florida Fair is a great institution for Tampa, a great institution for South Florida, but more than all, it is a great institution for the citrus growers, as it gives the thousands of winter visitors an opportunity to see and realize the greatness of the citrus industry in Florida. The fair of 1921 will be the greatest in the history of the association.

Citrus growers and shippers have been "hit hard" by the readjustment of prices, but they have been no harder hit than the growers and shippers of other farm and grove products. The price tendency of all commodities is downward. Citrus men have been wise to recognize this fact and to base their efforts at a solution of their marketing problems on a reduction in the cost of production and transportation. By this means only can they hope for a permanent readjustment along profitable lines.

No grove owner can afford to "starve" his grove to meet lessened profits through price reduction. He must meet his financial problem in some other way.

A starved tree cannot produce either a bountiful crop nor a high grade quality of fruit.

# Citrus Physiology and its Modifications

By D. W. Hadsell, Citrus Pomologist

Florida citrus growing has its tens of thousands of enthusiastic followers and represents a very large proportion of the state's agricultural wealth, not primarily because of its undisputed claim to being the most healthful and interesting of all farming occupations, but mainly because of its probable, and possible returns to the grower in the way of an attractive labor income. There are, likely, many groves in the state which are not profitable. Even the

boxes, netting the grower a dollar a box profit, and capitalizing this state return at ten per cent. would set, what many term a low valuation, of one hundred million dollars for the bearing groves of the state. To this must be added the valuation of the very large plantations of young groves in the choicest section of citrus Florida. Though the natural conditions and environment for citrus production in Florida are highly favorable, making possible a profit

ing, individually and collectively, is profitable one year with another?" These observations apply very particularly to citrus growing. There are a number of agricultural enterprises which produce glittering returns in favorable years, but which during longer periods average a loss rather than gain; in such sections of farming we have a population of debtors; fertilizer companies cannot collect on their notes, and agriculture is a huge gamble. To take the



A TYPICAL YOUNG GRAPE FRUIT GROVE.

average income derived from Florida Citrus Growing may not present much inducement to the investment of capital,—but it is universally admitted that average results in any line of agriculture are only truly satisfactory to what we may term the "lackadaisical piker." It is the probable returns under scientific management, and the possible returns self-evident from past accomplishment, which interest the intelligent grower and prospective grower, and these figures do not belittle the industry in the slightest.

From groves operated with but moderate efficiency, returns of 20 to 30 per cent. on the valuation are not at all uncommon, and with the application of more scientific management these returns have often been doubled and trippled. Based on an annual citrus crop of ten million

under methods of management which would not pay in some of the Pacific Coast sections where scientific methods are universally followed, still increasing competition and crop output, and necessity of higher returns to meet the present price level and higher standard of living, demand a more intensive citrus culture and better efficiency in the operation of our groves.

Secretary of Agriculture E. T. Meredith says, "It is universally agreed that the prosperity of our business interests and the welfare of our entire population is largely dependent upon the prosperity of agriculture. Is it not equally obvious that agriculture, as an industry, cannot prosper, and that farm production cannot be maintained or increased to keep pace with our growing population, unless the business of farm-

gamble out of citrus growing, where such exists, and insure regular and lucrative returns, a knowledge of citrus physiology and its possible modifications is highly advisable.

"The profitability of the farm business," according to Secretary of Agriculture Meredith, "depends upon three things—ample production, minimum cost of production, and adequate prices." The matter of adequate prices may well be entrusted to the enterprising citrus grower, and eventually will be the least of the growers' problems. "Adequate production," says Secretary Meredith, "at minimum cost, involves more efficient methods and economical operations. In this the following may be mentioned as important factors:

Better utilization of the soil.

Better prevention of soil erosion.



Better maintenance of soil fertility by conserving soil moisture and manure, and by a greater use of legumes in rotations and as companion or intertilled crops.

The greater use of machinery and practical mechanical power on farms.

More intelligent use of fertilizers.

The growing of more productive strains and varieties.

More effective methods of combating insect pests and plant and animal disease."

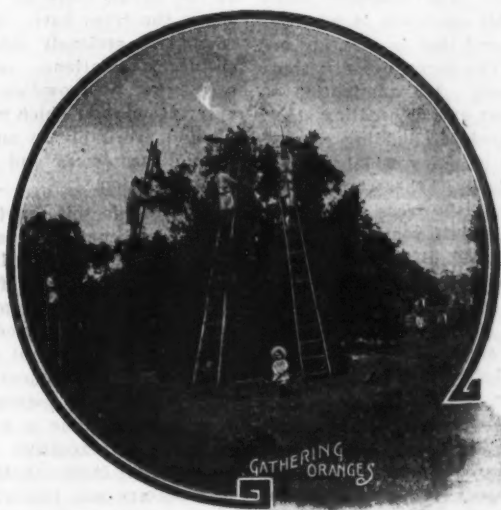
Realization of an adequate production at minimum cost by these and other means, depends very largely upon the constant consideration, and understanding of the variable factors influencing the growth, fruiting, and health of the tree in citrus enterprises.

During the past sixty years of its history in this state, citrus growing as a science, has received far too little intelligent thought and investi-

gation, and only during the past decade or two has our expert knowledge of this industry been much increased. Today considerable valuable information is available on this subject. The United States Department of Agriculture has published several bulletins on various phases of the industry, the latest being Farmers Bulletin No. 1122, "Citrus Fruit Growing in the Gulf States," a concise, authoritative general treatise, of much value to the average grower and prospective grower. The State Agricultural Experiment Station, in spite of the past and present deplorable deficiency of funds appropriated for this important work, have done much to systematize the

industry, and issue many good bulletins on the subject available to growers. One of the best and most valuable sources of information along these lines, lies in the study of the highly successful citrus groves scattered widely throughout the state. Their operators, many of whom are scientifically trained in agriculture, from years of close observation of the many and varied pomological practices involved in the growing of citrus trees and fruit, have been able to make intelligent deductions as to the value of each, and have worked out systems of management which they have applied with highly efficient results, and a consideration of these methods as they apply to the modification of citrus physiology is well worth while. The primary attainment toward which these and all commercial citrus growers are working should be very obvious and unmistakable, yet in present day plans and methods employed in Florida citrus growing, we often see; appar-

and even: between the different branches and fruit on an individual tree. When these variations are not due to the influence of environment or food, but are constant or inherent, they are known as "mutations," and are of much practical value in establishing new types because their characteristics are inherited. Such types may be perpetuated by "budding" and vegetative propagation, and the selection and propagation of valuable "mutations" or "bud sports" has given us many of the valuable varieties and strains of citrus fruit we are growing commercially today. The fact that a tree or a branch may have a heavy yield of fine quality fruit in any one year, is no sign of the origination of a mutation or new strain; it may be a "fluctuation" or unstable variation due to the influence of food or environment, and such variations are not inherent. "There is no scientific evidence," says Coit, "to warrant the belief that anything worth while may be gained by the selection and propagation of trees whose high yield is due to fluctuation. It is vital that the high yield be due to a true mutation, in order that the type may be propagated and progress made." L. B. Scott, pomologist of the U. S. Dept. of Agriculture, says, ". . . when you market your fruit as varieties and not simply as oranges and grapefruit, your problem is only partially solved. Not all the trees within the variety bear the same type of fruit. In the same grove we find marked differences among individual trees. You have got to go further than the variety; you will have to develop the best strain within each variety . . . How have these strains originated? By bud variation. In the Washington Naval orange alone we have found thirteen strains; in the Valencia twelve, and in the Marsh grapefruit five. Corresponding variations have been found in other varieties. The strains are found occurring as whole trees, as limb sports, and as individual fruit sports; some are worthy of propagation, many are not." Referring to Florida conditions he says, ". . . you have similar variations within your varieties. Even within the standard strain you will find differences in production of individual trees, which in many cases are so pronounced as to mean an actual loss on the whole grove to the owner. One tree bears eight boxes of fruit, the one next to it one. These differences are found to be consistent from year to year. No matter how much care and atten-



gation, and only during the past decade or two has our expert knowledge of this industry been much increased. Today considerable valuable information is available on this subject. The United States Department of Agriculture has published several bulletins on various phases of the industry, the latest being Farmers Bulletin No. 1122, "Citrus Fruit Growing in the Gulf States," a concise, authoritative general treatise, of much value to the average grower and prospective grower. The State Agricultural Experiment Station, in spite of the past and present deplorable deficiency of funds appropriated for this important work, have done much to systematize the

ently, no consideration of this viewpoint. Thus it may be stated here that the primary aim of the commercial grower is to secure THE HEAVIEST CONTINUOUS PRODUCTION PER ACRE AT MINIMUM COST OF THE BEST MARKETABLE FRUIT.

Of the many physiological factors which may be profitably utilized in citrus production, one of the most fundamental is the selection of budwood and stocks. According to J. E. Coit, noted citriculturist, "the unit of the plant is not the tree; it is the cell." The cell under subsequent growth develops trunk, branches, twigs, and fruit, and these constantly show many differences of characteristics between individual trees,

tion you give the one box tree, you cannot bring it up to the level of the eight. The one is inherently a heavy producer, the other is not. You will also find the eight box tree bears fine quality fruit, the other anything but fancy fruit. In all our work with citrus varieties we have generally found quantity is correlated with quality. The high producer as a rule also has the best quality fruit. How are you going to find these slacker trees, these drones in your orchard? The only efficient way is by securing individual tree performance records. By the term "performance record," is meant an actual record of the amount and quality of fruit born by each individual tree in the orchard for a series of years.

"As a result of the investigations which the Department of Agriculture has been carrying on for a number of years in the improvement of citrus fruits, commercial individual tree performance records are now being secured on thousands of acres of citrus trees in California, and in a number of groves in Florida and Alabama . . . . At least two years records, preferably longer, should be secured before a tree is actually condemned as being a nonproducer. At least four years records should be secured before any budwood should be cut from a tree for use in nursery propagation, or in top-working unproductive trees." There is a great field in this state for the selection of heavy-bearing, high-quality strains of our present varieties, for use in nursery propagation and top-working our unprofitable bearing trees, and we venture to predict that intelligent work along these lines would at least double the net profit realized from a multitude of bearing groves by top-working them to choice strains established by proper tree performance records. The old seedling trees from which so large a proportion of the state crop is picked, were grown from the seed, and thus no selective measures were employed in their establishment to insure high yields, good quality, or desirable market value. Many of them, which are still in a healthy, vigorous condition, and free from foot rot, may profitably be top-worked to prolific high-quality strains of our standard varieties. It costs just as much to care for a tree of poor type as it does to care for one of choice strain.

The choice of the root-stock is fully as important as bud-wood selection. First the right variety must be selected according to the character of land upon which it is to be

## THE CITRUS INDUSTRY

planted, and climatic conditions obtaining. Secondly, choice must be made of individual seedling trees of whatever variety is selected. The incorrect selection of stock variety usually prevents the ultimate success of the grove enterprise, or presents a great handicap against which the grower must continually struggle. The choice of individual trees for root stock, is based upon the same fundamental factors involved in bud selection, cell mutations and variations. The success of the grove is as dependent upon a highly-generative root system, as upon proper budwood selection. Herbert John Weber, in Bulletin 317, of the California Agricultural Experiment Station, at Berkley, says, "Large, medium, and small nursery trees of Washington Navel and Valencia oranges and Marsh grapefruit grown in comparative tests show that after two and a half years in the orchard the large trees remain large, the intermediate remain intermediate, and the small remain small. The evidence indicates that this condition is inherent in the trees and that in planting orchards only the large nursery trees should be used. An examination of sweet and sour orange seedling stock such as is used for budding showed the presence of many widely different types. Some of these types were propagated and the trees at the end of four and a half years still show the same marked difference. Some are fully five times as large as others. Yet all such types are used as stock. Budding on seedling stocks of different types and unknown character of growth is believed to be largely responsible for the different sizes of budded trees developed in the nursery and also for many of the irregularities in size and fruitfulness of orchard trees . . . . (1) Seeds for growing nursery stock must be taken from carefully selected good trees of the kind desired. (2) When transplanting from the seed bed to the nursery all small seedlings, probably fifty per cent. of the total number should be discarded. (3) Nurseries should be inspected before budding and all small and inferior plants cut out. (4) When budded trees reach the age for transplanting into the orchard, only the good vigorous-growing ones should be used." Vigorous root-system and prolific bud are highly inter-dependent; proper attention toward securing each will establish a grove foundation of inestimable value.

Having grown or bought the best possible nursery tree, the next con-

sideration is the effect of planting plans on its future behavior. As a general proposition, close planting induces fruitfulness and early maturity; fruition is encouraged and vegetative growth inhibited, proportionally. Thus the fertilizer applied is more efficient, producing more fruit in proportion to branch. The trees are more likely to "harden-up" earlier in the Fall, and thus be in a more dormant condition to better withstand the possible damage of Winter cold. Close planting, in itself, affords more protection against freeze damage through the mutual sheltering of the trees closely adjacent. The term, close planting, may mean any distance now being utilized in Florida groves, from 15 by 15 feet, 15 by 20 feet, or 20 by 20 feet, to 15 by 30 feet apart. Furthermore close planting, by reducing the costs per acre, and greatly increasing the crop output per dollar invested, presents one of the very best methods for increasing the efficiency of the citrus grove as a producer. When the trees have grown large enough to seriously interfere with cultural operations, and damage each other by crowding, removal of every other row, which may be transplanted profitably to another location, is the remedy and a most profitable solution.

A favorable soil environment as related to beneficial bacteria, soil aeration and reaction, drainage, and root area, is essential for best results. No matter how good the trees are and how well planned their establishment, they will not do well in a detrimental environment; too acid a soil will operate seriously against them; too alkaline a reaction, perhaps through excessive applications of lime, will injure them; deficiency of necessary soil bacteria will indirectly inhibit their growth and possibly poison them through the formation and accumulation of toxic substances in the soil. Too high a water table will drown them, while good drainage and root area go hand in hand to promote tree health and increase the available soil nutrients. Thus it is highly important to insure optimum conditions in the soil, the foundation of the grove, that these may not prove the limiting factors of production even though great efforts have been made toward utilizing all other factors favoring its success.

Selection and adaptation of varieties is important, and if not carefully considered, may nullify the best of precautions in other ways. It is gen-



erally believed, for example, that early grapefruit are particularly adapted to the lower East Coast, lower West Coast, and the Pinellas County and Gulf island citrus sections, as climatic conditions appear to bring them to early maturity in these sections. Early oranges, like the Parson Brown variety, are particularly adapted to northern citrus sections where earlier color and maturity is induced. It is also believed that "flatwoods" and similar soil types influence early maturity of certain varieties. The production of Valencia oranges in the northern limits of the citrus belt would present an unnecessary hazard from possible cold damage, as this variety is marketed late in the Spring. Such factors as these must be taken into consideration by the prospective planter, who may well confer with the best posted growers in the section selected for planting, as to the adaptation of the best commercial varieties therein. The climatic and local soil factors have a great influence on the physiological functions and profitable outcome of all citrus varieties.

With other factors favorable, a vigorous, well-balanced growth of new wood must be produced annually to insure prolific regular cropping. The citrus tree, under normal conditions, makes three or more growths of new leaves and twigs yearly, with intermittent rest periods. The most rapid and usually the heaviest growth occurs ordinarily in February in this state, and upon these new shoots the flowers are borne. Another growth occurs in early Summer usually, and a third in early Fall, after which the tree gradually "hardens-up" and goes into a semi-quiescent natural resting state during which the sap flow slackens, and the formation of new vegetative growth is checked. Any undue stimulation or treatment which disrupts this arrangement of growth is likely to be harmful to the tree and interfere with regular and prolific cropping. On the other hand every factor which may be utilized in assisting the tree in its natural functioning is likely to prove a profitable one. The maintenance of a moderate but steady food supply and sap flow during the growth periods is important. Excessive stimulation with quick acting chemical fertilizers which are soon utilized and dissipated with resultant checking of tree growth, is not conducive toward tree vigor, health, nor prolific bearing. Rather, the fertilizer applied should afford a continuous supply of the three or

four dominant food elements, in proper proportions, and thus provide for a normal, steady growth of branch and fruit. Maximum fertilization, profitably applied, makes for highest efficiency of this factor. Such amounts are best determined by actual plot experiments by grove owners. The use of certain materials in the fertilizer used may prevent the use of the maximum amount of fertilizer which is profitable, by causing a soil solution concentration injurious to the tree. The highly soluble mono-calcium phosphate, contained in commercial "acid phosphate," goes into solution in the soil very rapidly, and if used in too large amounts it is quite possible that this might do considerable damage to the citrus tree. Steamed bone, on the other hand, is not quickly soluble, and depends for its practical availability to the tree, upon a gradual rotting process. It would probably be impossible from a practical standpoint, to apply enough steamed bone to damage a tree in any way. Thus the use of certain safe or choice materials in citrus fertilizers permits a heavier application and a possible higher efficiency from such use of commercial fertilizers. Along with adequate supplies of choice plant food, we must maintain optimum soil moisture conditions as all plant food is taken in by the roots dissolved in water. Deficiency of soil moisture checks tree growth, and when followed by copious rains frequently causes much splitting of fruit, though it is thought by good authorities that such splitting occurs only in susceptible strains of fruit and might be eliminated by bud selection.

The tendency of the citrus tree toward a natural resting period during which vegetative growth is checked, must be encouraged. Undue stirring of the soil between November and February; fertilization with too much "ammonia"; irrigation, especially during warm weather; or other stimulating processes tend to interfere with the natural functioning of the tree at this time of year and may cause it to put out an abnormal growth of new shoots and bloom which would very likely be frozen. A well-fed tree in a dormant condition is best able to withstand cold damage, and effort should be directed to keep it in this condition. Finally it is a very important point in citrus production to guard the tree against insect pests and diseases, as these reduce the crop, lower its quality and market value, injure the tree,

and reduce grove profits. Strong well-fed trees are resistant to certain diseases, and the inroads of insect pests do not do as much damage. However certain diseases and insects may only be controlled or eradicated by a thorough spraying schedule, and this must never be neglected when needed. The physiological disease known as "dieback" is one of the most common in Florida and a cause of large annual loss. Its cure, however, is not particularly difficult, and lies in the application of bluestone, commonly applied in the coarse crystal form on the ground around the trees affected, in doses of 3 to 5 pounds on fairly large bearing trees. Bluestone, containing copper, is an active poison, and taken into the tree through its roots in this manner, seems to have a very stimulating effect on the growth of the tree which results in its outgrowing the physiological derangement.

The citrus tree among fruit trees is one of the most responsive to either favorable or unfavorable conditions; it pays to treat it well. In the more backward citrus sections many groves in full bearing do not average over 75 or 100 boxes per acre, while in sections of more scientific management yields frequently average 300 to 600 boxes per acre on large bearing groves. The writer believes it entirely possible to produce 1000 boxes per acre ten years after planting to oranges, 15 feet apart each way. There is no doubt but that a well-planned utilization and modification of the physiological characteristics of the citrus tree in commercial enterprises, will result in exceedingly handsome returns to the intelligent citrus grower; a lifetime's devotion of one's efforts to such study should yield lavishly in income, pleasure and health, and add much useful knowledge to our worldly stock.

#### GREAT CITRUS SHIPMENTS

Last year's orange shipments from California if packed in a single layer would form a continuous highway ten feet wide from the Pacific to the Atlantic. Numerically the shipments aggregated 3,001,753,920 single fruit. If placed in a single line end to end this volume of fruit would reach from Los Angeles, across the Pacific, entirely around the globe and enough left over to make a second line around the world as far as Chicago.



# Should Take Steps to Control Lemon Scab

By H. E. Stevens, County Agent, Lee County, Florida

The time has now arrived when the first steps should be taken in the control of citrus or lemon scab.

A clean up or dormant spray should be made before the new growth puts out. In groves where scab is troublesome this should be kept in mind and the necessary preparations made to do this spraying a week or 10 days in advance of the new growth.

Citrus scab is one of the serious troubles of the grapefruit in Lee county and one that is frequently responsible for a large cull pile or probably an entire crop of low-grade fruit. The disease may be found in any section of the state where grapefruit, sour oranges or rough lemons are grown, however it appears more abundant and troublesome in the southern counties of the citrus belt. It is a disease that thrives best in a moist atmosphere and the high humidity in this section of the state is favorable for the development and continuation of the disease from year to year. The severity of scab, however, is influenced largely by the character of the weather during the period the trees are blooming and setting fruit. If it is dry during this period the fruit may escape or be little affected by scab. If it is wet and cool during this period 90 per cent of the fruit may show scab infections to such an extent as to not be worth marketing. Thus weather conditions during the early development of the fruit have a great deal to do with the amount of scabby fruit that is likely to result in groves where the scab fungus is present. To avoid scab on grapefruit it is necessary to protect the young fruits through a period of four or five weeks during this early period of growth. This may require two, three or four sprayings with some good fungicide.

When a fungicide, especially Bordeaux mixture, is sprayed on the citrus tree this is usually an invitation for more trouble from scale insects. Any fungicide used to kill the disease germs will also kill the friendly fungi which normally keeps the scale in check. Thus when their natural enemies are destroyed the scale increase very rapidly and it is necessary to follow soon with some insecticide spray to prevent the scale from doing serious injury to the trees. Naturally the citrus grower

hesitates to use a fungicide in the grove, but if scab is to be controlled there is no other course to follow. The necessary applications of fungicide must be made to protect the fruit from scab and then must follow the required sprayings to keep the scale and other insects down.

How many sprayings are necessary to control scab and what fungicide should be used? This question is not easily answered, as it depends largely upon the severity of scab in the grove and weather conditions that are likely to occur during the bloom period and following. Hammock groves or those in low moist situations will require more spraying than groves on high, dry soils.

The scab organism is carried over from year to year on the old leaves of the grapefruit tree. These scab infected leaves are the sources from which the disease spreads to the new foliage and fruits in the spring. One of the first steps then is to make these old scab-infected leaves as harmless as possible before any new growth or young fruits appear on the tree. By covering the surfaces of such leaves with a coating of fungicide a large percentage of scab spores that are produced in the scab spots will be killed, reducing the chances for infection on the new growth and fruits later. The first spraying then should apply to the old infected foliage and should be made before new growth appears and must be made before the bloom appears if results are to be expected. This is the clean-up or delayed dormant spray and it has proven a decided advantage in helping to keep scab down in various scab spraying experiments that have been carried out. This one spraying alone, however, is not sufficient to control scab. A second spraying must be made into the bloom period. Scab infection takes place on very young tissue and young fruits that have just dropped the bloom are very susceptible to infection. The bloom spray is necessary to protect the fruits at this stage of growth. A third application of fungicide should follow in two weeks after the bloom spray. In an ordinary season these three sprayings should be sufficient to control scab. If, however, a rainy period should follow the third spraying a fourth application may be necessary two weeks after the third. Then watch the trees for scale or

whitefly and as soon as these become numerous use the oil sprays or emulsions.

Now as to the fungicide to use. I hesitate to advise the use of Bordeaux mixture on the citrus tree, but in severe cases of scab this fungicide will be required to do the work, especially if the season is wet. Where scab has been troublesome in the grove in past seasons and the old scab infected leaves are numerous it will be advisable to use Bordeaux mixture for the clean up spray at least. If it is wet and cold during the bloom period and following, the Bordeaux should be used in the other applications. The 3-3-50 Bordeaux will be of sufficient strength and it should be prepared with surface or shallow well water if possible. Complaints have been made of severe burning of the young foliage by Bordeaux made from deep well water and I have seen injury caused by such in some spraying that was done last season.

Oil-emulsion can be added to the Bordeaux mixture which will assist in keeping the scale down to some extent. Mr. Winston, plant pathologist of the United States Department of Agriculture, has used this combination of Bordeaux oil-emulsion for several seasons now and it has given very good results. The addition of oil-emulsion to the Bordeaux makes it spread and stick better and does not affect the killing qualities of the fungicide. The oil-emulsion also kills any scale on the trees at the time it is applied. However this combination kills the friendly fungi which permits of an increase in scale afterward. I would suggest, however, that the Bordeaux oil-emulsion be used in place of the straight Bordeaux especially if the trees show any evidence of scale. For the dormant or clean up spray use sufficient oil-emulsion with the Bordeaux to give 1 per cent oil in the total mixture. This will require three quarts of oil-emulsion to fifty gallons of Bordeaux mixture. First prepare the Bordeaux in the usual way and put it in the spray tank. Start the agitator and add the oil-emulsion while the mixture is being agitated. Any of the commercial brands of oil-emulsion may be used or you may prepare your own emulsion according to the following formula:

**Preparation of Boiled Oil Emulsion**

Paraffin Oil ..... 2 gal.  
 Water ..... 1 gal.  
 Fish Oil Soap ..... 2 lbs.

Put oil, water and soap into a kettle or vessel that will stand fire, and heat to the boiling point. While still hot, but after removing from the fire, pump the material into another vessel with a bucket pump and then back again. The pumping back and forth is to thoroughly emulsify the mixture. Any other means of agitation may be utilized. A sufficient amount of oil-emulsion may be prepared at one time to last during the season and stored in barrels for use when desired.

If Bordeaux oil-emulsion is used for the bloom and third spraying add only enough emulsion to give  $\frac{1}{2}$  per cent oil to the mixture. The bloom and young fruit will not stand more than  $\frac{1}{2}$  per cent oil.

It must also be remembered that the rust mite increase very rapidly following the use of Bordeaux oil-

emulsion and these should not be over-looked.

The above schedule, three sprayings with Bordeaux oil-emulsion for the control of scab is recommended in cases where the scab is particularly bad and the season is favorable for the development of the disease. This schedule may be modified to suit conditions. The Bordeaux oil-emulsion may be used for the first or dormant spraying and lime sulphur solution 1 to 40 substituted for the second and third applications, provided it is not wet during this period. The use of lime sulphur in the second and third applications should eliminate all danger of early injury from rust mite.

Where scab is only moderately abundant the lime sulphur solution may be used for the three scab sprayings, the dormant, bloom and third application. This will apply to groves on the higher, dryer soils and where the old foliage show little evidence of scab.

There is little advantage to be

gained in substituting the ammoniacal solution of copper carbonate for either Bordeaux or lime sulphur solution. This solution is a good fungicide but it is only effective for a short time after application. It will probably not give protection more than a week or ten days. So to get the same protection that you would from the use of Bordeaux or lime sulphur, double the number of sprayings may be required. If the old crop of fruit is on the trees when the dormant spraying is made, it might be a question of deciding between Bordeaux mixture and the ammoniacal solution of copper carbonate to prevent staining of the fruit. Bordeaux will leave an objectional coating on the fruit which the ammoniacal carbonate does not. I am somewhat doubtful as to the effectiveness of a dormant spray in which the Ammoniacal solution of copper carbonate is used. The oil emulsion has not been used successfully with the ammoniacal solution of copper carbonate yet.

## Will Be a Great Machinery Display

Next to the wonderful display of citrus fruits to be made by individuals and counties at the South Florida Fair which opens in Tampa the first week in February, probably the most interesting feature of this great fair so far as citrus growers are concerned, will be the display of farm, grove and packing house machinery and equipment.

This feature of the South Florida Fair has always been very extensive and has attracted wide attention and much interest, but the exhibits of this nature at the coming fair promise to eclipse all previous displays. Practically all of the available space for exhibits of this nature has been taken, notwithstanding that the space devoted to this feature of the exposition has been greatly enlarged.

Tractors and trucks, sprayers and spraying materials, plows, harrows and discs, packing house equipment, grove tools and picking equipment, pruning implements, engines, farm lighting plants and water systems—in short every possible modern equipment of farm and grove management will be shown among the exhibits in Machinery Hall—and each one will have its special interest for the up-to-date grove owner and manager.

Much space will be devoted to the tractor display and every tractor adapted to grove work will be seen in operation on the grounds. Manu-

facturers of Florida made tractors will have their machines in operation, while state distributors and manufacturers' representatives of other tractors designed for grove work will make a proper exhibit and display of their machines. The same will be true of sprayers and spraying materials, and in this line the exhibits promise to be particularly extensive.

Trucks and automobiles will hold a prominent place in this department, and the prospective truck buyer will be able to see and compare the many different makes designed for work on the roads and in the groves.

The line of general farm and grove implements will be by far the largest ever seen at the South Florida Fair and will embrace every-known implement used in farm and grove work. Special grove implements, such as pruning knives and shears, picking bags and packing cases, also will be seen in great variety.

Stationary engines, farm lighting plants, water systems and other labor saving devices which have become common adjuncts of the grove owners' homes, will be shown in an endless variety of makes, while the labor saving devices for the home itself, power washing machines, power pumps, improved ironing devices and other home equipment de-

signed to lighten the labor of the housewife, will be shown in great profusion.

The men in charge of this department of the fair have spared no pains to make this feature both entertaining and educational, and in this effort they have been ably seconded by the exhibitors, who have planned their displays with especial reference to the requirements of the South Florida farm and grove home.

No visitor to the Fair will have done justice, either to himself or to the Fair management, if he fails to devote much time and study to the machinery department. This is particularly true of the grove owner, for whose benefit, largely, this great exhibit has been planned and so extensively featured.

Dr. A. L. Quaintance, of the United States Department of Agriculture, Prof. H. J. Quale and E. O. Essig of the University of California and Harry S. Smith of the California department of Agriculture recently held a conference with Director Hecke as to the general policy of insect control work. It was decided to form a permanent committee to advise with the state director on important pest problems.

# May Effect Strong Organization

That the prevailing unsatisfactory prices of citrus fruits, coupled with high cost of production and excessive transportation charges, may result in an organization of Florida growers and shippers which will prove beneficial to the entire citrus industry in the state, seems now within the range of probability.

Certain it is that recent meetings of large citrus interests at Leesburg, Orlando and Jacksonville appear to have laid the foundation upon which a strong superstructure of organized effort may be built.

The outlook is particularly bright when it is considered that the strongest individual growers and shippers, as well as many of the strongest marketing organizations in the state have participated in the preliminary gatherings and have pledged their support to an organization designed to benefit the growers and shippers through the solution of the many vexed problems now confronting the industry.

Reduced cost of production, lessened cost of handling, lower rates for transportation, stabilized labor wage, are among the matters which the growers and shippers are now seeking to solve. Realizing that these problems are too great to be successfully coped with by any one individual or organization, the effort to bring about a solution through the organized effort of all factors in the citrus industry of the state was inaugurated some weeks ago. This effort resulted in numerous meetings, first at Leesburg, and later at Orlando and Jacksonville, when the varied citrus interests of the state, both individual and organized, sought to find some common ground on which all could meet for the consideration and solution of the many vexing problems with which all in common were confronted.

That the foundation, at least, for an organization sufficiently wide in scope and of sufficient strength to cope with existing conditions, has been laid appears manifest from the character of the men who have been named to promote the organization.

Among the factors which are intimately associated with the movement for a great statewide organization are The American Fruit Growers, Inc., The Standard Growers Exchange, S. C. Chase, John S. Taylor, F. E. Lane, H. T. Montgomery, E.

W. Walker, Dr. Phillips, A. J. Nye, Charles Turner, J. Thomas, S. J. Sligh, Walter Preston, W. E. Lee and other prominent citrus growers and shippers of the state.

With such men and such interests acting in concert for the good of the industry, it is certainly not too much to expect that some solution of present problems may be found which will be of permanent benefit not only to the individuals and organizations directly connected with the launching of the organization, but to the entire industry in the state.

Whatever of friction or lack of harmony may have been apparent in the earlier meetings appear to have been eliminated from the last meeting of citrus interests held in Orlando at a recent date, when the best of feeling and harmony prevailed. At this meeting, assurance was given by some of the strongest factors operating in the state that full and complete support would be given to every effort to re-establish the industry in the state on a firm and sound basis which would make for profitable operation by every grower and shipper of citrus fruits in the state. This appeared to be the dominant spirit at the meeting.

In response to a call issued by R. P. Burton of Leesburg, chairman of the committee on organization appointed at the mass meeting of growers and shippers of citrus fruits and perishables, on Dec. 28, five of the committee members met with interested delegations in Orlando, Jan. 11. The committee and identified interests before the close of a rather prolonged session formulated initial plans looking to an organization of all independent shippers and operators into a closely working body. While these plans are by no means complete and will need a good deal of whipping into shape before a thorough co-operation can be secured, the intent and aim of the proposed organization has behind it most, if not all, the largest and most influential factors in the state.

Before the close of the meeting a committee of fifteen or more members was appointed to arouse interest in the need for action on the question of co-operation to preserve the fruit and produce industry of Florida. Provision was made for the addition of other names to the committee from independent operating

concerns in every county in the state.

Those already appointed are Lawrence Gentile of the Standard Growers' Exchange, Orlando; Frank L. Skelly of the Florida Fine Fruit Company, Orlando; F. E. Lane, DeLand; H. T. Montgomery, Tampa; E. W. Walker, Orlando; Dr. P. Phillips, Orlando; Charles Turner, Umatilla; J. Thomas, Jacksonville; S. J. Sligh, Orlando; Walter Preston, Tampa; W. E. Lee, Plant City; A. J. Nye, Orlando; John S. Taylor, Largo; S. C. Chase, Sanford.

This committee, with other members to be appointed, will meet in Orlando on Jan. 20. Its members will on that date confer with the full membership of the organization committee and take such action as may be necessary to advance the cause.

L. C. Edwards of Thonotosassa argued that one of the causes leading to chaos in the citrus industry was the fact that shippers and growers—70 per cent of them at least—are working in the dark, operating a business without information as to what competitors are doing. He illustrated his point by declaring that hardly a section in the state is selling fruit on equal terms with the other. Other speakers were heard along the same line.

J. S. Crutchfield of the American Fruit Growers, Inc., promised on behalf of his interest full and complete support in all efforts to rehabilitate the industry. He made it plain that any attempt to co-operate along the lines proposed would find his organization willing to give its support.

The meeting is considered the first real step in the efforts to reach the independent shippers yet made.

The new officers of the La Verne (Calif.) Lemon association are: President, H. E. Howard; vice-president, L. E. Cree; secretary and manager, J. W. Lamont. D. C. Crookshank, I. L. Noggle, H. V. Bright, A. J. Gilbert and J. Webber were elected to serve as directors with Mr. Howard and Mr. Cree. The association shipped 129 cars of lemons.

Wherever the farm bureau is functioning, farmers are buying their groceries and supplies and selling their farm products at greater savings and profits than farmers elsewhere.



# Memorial Roads and Reforestation

By H. O. Bishop

(The extent to which the many "Roads of Remembrance" may be utilized in the movement for reforestation has probably not occurred to many of our readers. It is just hinted at in the following article by H. O. Bishop, who shows that Florida is taking the lead among the states in the planting of trees along "Memorial Highways.")—Editor.

The suggestion of the American Forestry association, which was made the next day after the signing of the armistice, seems to be getting attention in the country. It was urged that trees be planted in honor of America's soldiers and sailors, both as memorials to those who gave their lives and as a tribute of appreciation to the living for their valiant services.

This memorial tree planting proposition has apparently struck a nationwide chord, and is receiving the support of people in all walks of life in every state in the Union.

Americans are awakening to the bigness of the idea of seeing their towns, cities, parks and local as well as transcontinental highways beautified with handsome trees.

The Rotary club of Tampa, Fla., has just completed planting memorial trees along a 15-mile stretch of the famous West Coast road. At either end of the road a memorial arch has been erected, on which are inscribed the names of the men of Hillsborough county who answered the call of their country. The road leads to Pinellas county, and St. Petersburg, which is in Pinellas county, will take up the work of planting from the county line to that city. Sarasota, also in Florida, claims the first victory highway in that commonwealth. In Volusia county the "Pershing Triangle" is to be planted with memorial trees. This will be a road from Deland to Daytona, to New Smyrna and back to Deland. All the trees are to be registered on the national honor roll that is being compiled by the American Forestry association. It is such activities that picture the wonderful possibilities for making America the most famous country for the tourist in the years to come.

In the planting of the Lincoln highway there comes great opportunities for a national memorial that

will be more than worth-while. The work is rapidly going forward in many places. At York, Pa., for instance, the women's clubs, under the direction of Mrs. J. B. Hamme, will plant, in co-operation with the chamber of commerce, a stretch of 25 miles of this great road. Through Indiana each mile is to be named for a famous son of that state, but the trees are to be marked for the men of the counties through which the Lincoln highway passes.

Out of Chattanooga, Tenn., memorial trees have been planted by committees organized by Miss Mollie E. C. Kavanaugh and Mrs. D. P. Montague. At Middletown, Ohio, the welfare association, directed by Mrs. C. R. Hook, is planting trees along the Dixie highway. Ben Allen, president of the Rotary club at Washington, Ind., has lined up his club for the planting of memorial trees in honor of the soldiers of that county.

At Minneapolis a "Road of Remembrance" will be completed in 1921 that will connect two city parks. The vase type of elm is being used in this instance, and these trees are now in training for the shape they are to take in 1970. Fifty years from now Minneapolis will have one of the sights of the North American continent in the way of a memorial.

Different species of trees are to be planted along the new roads in Michigan. Along the highway from Chicago to Saginaw walnut trees are to be planted and this will be called the Victory highway. The people along the route have volunteered to improve and beautify their property so as to harmonize with the road. This is a good illustration of the way in which tree planting leads to other civic improvements.

The state of Maryland is one of the first to get its highway program under way. The National Defense highway between Bladensburg and Annapolis will be a memorial to the Maryland soldiers in the great war for civilization.

The Oregon Federation of Women's clubs is backing a plan for a Roosevelt road, each side of which will be planted with trees.

In New York a bill has been introduced to create a state commission to prepare plans for a Roosevelt Memorial Trunk highway from Montauk

Point to Buffalo. The city of Buffalo is now considering the project of a memorial bridge to connect Canada and the United States.

The state of Indiana is rapidly formulating plans for the planting of a memorial grove for every county in the state.

In Louisiana trees have been planted along the highway that leads from New Orleans to Winnipeg.

In speaking of memorials to our soldiers, Charles Lathrop Pack, president of the American Forestry Association, said: "The people are anxious to express their gratitude to the war heroes. A monument needs the perspective of time as well as the hand of an artist. Therefore let us build roads of remembrance and, when these are finished with their beautiful bridges and the proper setting of memorial trees, then place the monuments at the intersections and along the roads. Millions are to be spent on roads. Let them be spent wisely.

"In roads of remembrance we have the opportunity to make our country the most beautiful in the world. While serving the great needs of commerce, now enlarging before us, these roads will, indeed, become the friend of man, for they will bring men closer together. Thus it will be seen that the doughboy, after all, has brought us all closer to 'The Great Tree Maker' and has erected his own monument—a better country than that in which he was born and for which he fought. With that monument the doughboy will be satisfied."

The colossal road-building program now under way in every state in this country, made necessary for the proper development of commerce, agriculture, education and Christianity, will make it very easy for thousands of communities to create "roads of remembrance."

The road-building programs now before this country involve the expenditure of \$340,000,000. This means that the taxpayers of the country, as usual, have a vital interest in the expenditure of that money, but will have comparatively little to say about the expenditure. Now if the taxpayer can have a vital and intimate part in the beautification of these roads with the planting of trees it becomes his road and he will take

(Continued on Page 22)

# The Windbreak as a farm Asset

Farm Bulletin No. 788

(The publication in the November number of The Citrus Industry of an article by P. L. Waycupp on "The Relation of Deforestation to Citrus Culture in Florida," has attracted such wide attention and created so much favorable comment, that we publish herewith the Federal Farm Bulletin No. 788 on "The Windbreak as a Farm Asset." While this bulletin deals with conditions on the broad scale of national necessity, it is so applicable to conditions as they exist in Florida that it is given here in the hope that it may add still further to the interest which has been created by Mr. Waycupp's article.)

—Editor.

## Windbreaks on the Prairies

When the prairie regions of the middle west were first developed the lack of trees was felt severely. The clear sweep of the winds across the flat plains was a great hindrance to agriculture, for the soil dried out quickly by evaporation, and grain was lodged and orchards injured by the mechanical force of the wind. Windbreaks were the only remedy, and thousands of miles of them were planted along roads and farm division lines. The effect of this planting, though only gradually felt, was very distinct; farming and living conditions became more favorable throughout the whole region.

Considerable planting is still being done, but probably no more than enough to counterbalance the cutting in windbreaks already planted. Of course the need of windbreaks is not so acute now as it has been in the past, but some extension of the planting in this region is desirable, at least enough to protect the new areas which have been put under cultivation.

Any body of trees which gives protection to buildings or crops may be called a windbreak. This bulletin has to do, however, only with belts of trees planted about fields and farm buildings, especially for the purpose of breaking the force of the wind. The typical windbreak is a belt consisting of from six to eight rows of trees and usually from a quarter of a mile to a mile in length.

## Checking Wind Movement

The influence of a timber windbreak upon air currents is purely mechanical. Its effectiveness de-

pends, therefore, upon how nearly impenetrable it is. The ordinary windbreak does not provide an absolute barrier to the wind; a certain amount of air forces its way between the branches and foliage of the trees, so that the movement of the air on the leeward side is not completely stopped, but only greatly reduced. When windbreaks composed of such trees as cottonwood become old, wide openings are left between the bare trunks and more wind gets through near the ground than higher up. Such windbreaks can be made efficient only by underplanting the cottonwood with other trees or shrubs.

An ideal windbreak for checking wind currents would have the contour of an earth dam. In the central rows would be planted the tallest trees, such as cottonwood; on either side, rows of shorter trees, such as ash and locust; and outside of these low bushes or cedars. Such a windbreak would not be easily penetrated, and its inclined surface would divert the air currents upward and relieve the horizontal wind pressure.

Breaking the mechanical force of the wind benefits the farmer most directly by protecting his grain crops and his orchard. The value of the windbreak in giving this protection is, of course, difficult to measure in dollars and cents, but where winds are at all frequent such protection alone may be equal to the rental of the ground occupied by the trees. In one case in southern Minnesota a windbreak, 80 rods long and about 28 feet high along the side of a cornfield, afforded complete protection for a strip about 10 rods wide during a wind blowing at 50 miles an hour. On the unprotected part of the field the wind blew down half the corn and bent the remainder halfway, the damage beginning at the edge of the 10-rod strip and increasing until it was greatest in that part of the field farthest from the windbreak. The corn was in the milk stage at the time of the high wind and did not produce more than a third of a crop on the damaged area. On the protected portion the total saving was 260 bushels, or the full crop of six acres, whereas the windbreak occupied only two acres.

Movement of the topsoil also may be checked and dust storms prevented

ed by breaking the force of the wind. For this reason windbreaks are of immense benefit in sandy regions or regions where the soil is very fine.

Added to the crop and soil protection there is the personal comfort to be derived from protection from wind about the farm and home and along public roads. Furthermore, a protected home is heated in winter more readily, and hence more cheaply, than one exposed to the wind.

## Reducing Evaporation

There is no part of the United States, except small areas in the Appalachian and Cascade mountains, which normally obtains more precipitation than is needed for growing the best crops. The farmer usually plows, cultivates, and mulches, with the object of conserving every drop of water that may reach the soil during the year. In the "dry-farming" regions of the west these conservation measures are carried farthest. Here it may be necessary to save the moisture of two seasons to grow a single crop.

Anything which helps to conserve the moisture of the soil is of direct benefit to the farmer. The windbreak has this effect in a marked degree. The drying power of the wind is reduced by the windbreak very nearly in the same proportion as its velocity. In the immediate lee of the most effective windbreaks evaporation is reduced as much as 65 per cent. Farther from the trees the reduction is less. The amount of reduction depends not only upon the density and proximity of the windbreak, but upon whether the field is fallow or in crops. The saving in moisture is least when the field is fallow, so that the only reduction is in the direct evaporation from the soil; it is greatest when the field is in crops, so that there is a reduction not only in the direct evaporation from the soil but also in the evaporation from the leaves of the crops.

The more frequently winds occur in any locality during the growing season, the greater their velocity and drying power, the more important it is to use every means of preventing evaporation. Windbreaks are especially valuable, therefore, in the middle west, where hot, dry winds, often of high velocity, are of frequent occurrence during the summer months, and in Montana and the Dakotas,

where the warm west winds of the winter and early spring, known as "chinooks," do great damage to winter wheat and orchards.

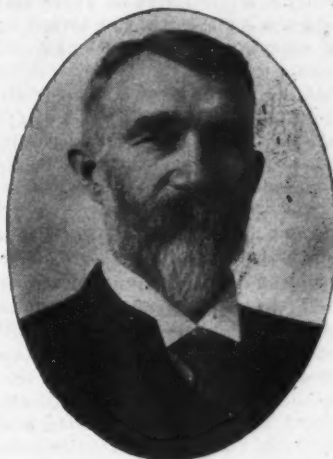
#### Effect on Temperature

The farmer who has cultivated crops on a hot summer day need hardly be told that the warmest part of his field is the portion which is sheltered from the wind. In the lee of the windbreak there is not only no breeze to cool the body and reduce what is known as the "sensible temperature," but the actual temperature of the air is raised. Tests with a thermometer have shown that the area which is protected by a windbreak may be several degrees warmer during the day and several degrees cooler during the night than adjacent areas not protected.

Such crops as corn are benefited very greatly by warm, sultry days. The windbreak helps to create these conditions and offsets to some extent the effect of cold, cloudy weather. The cooling effect at night is of course unfavorable to growth then; but the night is a period of comparative rest, so that the nocturnal cooling off is far more than counterbalanced by the higher temperatures secured during the day.

Windbreaks may appear undesirable for the protection of orchards in blossom or garden crops which are not hardy, because the danger of still frost seems increased by the stagnation of the air on the lee side. The added danger is more apparent than real, however, for still frosts only occur when there is practically no wind, and a windbreak can then have little effect one way or the other. Furthermore, complete stagnation of the air may be helpful rather than harmful if smudging is resorted to.

The freezing which often causes the most severe damage to orchards is that which follows a cold rain or late snow. During such a freeze the damage to blossoms is greatly reduced by protection from wind; for evaporation which produces a rapid cooling increases in proportion to wind velocity. During a freeze of this kind in Nebraska in 1908, fully protected orchards yielded crops many times as heavy as those without exterior protection, and even the leeward side of individual trees exposed to the wind suffered much less damage than the windward side. It is noteworthy also that the one storm of rain and snow, with a temperature of 28 degrees, did all the damage during the season, and that later frosts with lower temperatures did



JUDGE W. S. PRESTON

After a quarter of a century of activity in the development of Polk county, Judge Preston is still planting citrus groves. He is just completing the planting of a 120-acre tract of fine citrus land in the Auburndale section.

not affect the orchards.

#### Effect of the Windbreak on Yield of Crops

The effect of a windbreak on crops is not beneficial in every respect. There are certain ways in which it is plainly injurious. Trees in a windbreak always spread their roots extensively into the adjoining fields in search of moisture; and they take not only the moisture but some of the nitrogen content of the soil. Furthermore, by shading the ground they may prevent crops from developing properly.

Whether the total effect of a windbreak is good or bad depends upon whether the benefits derived from its influence on wind movements, temperature and evaporation are greater or less than the injury resulting from the sapping and shading of the ground near by. To determine the total effect, crop measurements have been made in Nebraska, Kansas, Iowa and Minnesota. Average rather than exceptional conditions were measured, the object being to discover the effect of those influences which are continuous and affect every annual crop grown.

Measurements made in fields of small grain indicate that the crop gain in the protected zone is sufficient to offset fully the effects of shading and sapping. In a wheat field protected by a dense windbreak the gain amounted to about 10 bush-

els per acre where the protection was most complete, and gradually grew less as the distance from the windbreak increased. The total gain was about equal to the amount of grain which could have been grown on the shaded ground near the trees. The season in which the measurements were taken was not of high winds, nor did it lack moisture. It would appear, therefore, that in a windy year when evaporation was high the total gain for the field would much more than balance the loss. In another case, barley on the south side of an ash and honey locust windbreak benefited very materially from the accumulation of snow in the lee, and the conservation of this moisture. Here cultivation was possible within four feet of the stems of the trees, so that the increased yield of the field, amounting to about 14 bushels per acre at the highest point, was practically clear gain. The total gain for the whole field amounted to the yield of a strip of ground as long as the windbreak and three times as wide as its height. In other words, had the windbreak, which was 20 feet high, occupied a strip of ground 60 feet wide, the gain in the field crop would have paid the rental on all of this ground.

The corn crops showed more consistent and marked benefits from protection than any others. In the region concerned the summer winds are almost wholly from the south, so that the only effective rows and belts extended in an east-west direction. The effect on corn was very marked for a short distance on the south side of such windbreaks and for a much greater distance on the north side. Fields of young corn showed much better growth in the area protected and warmed by the windbreak. The effect was visible to the eye early in the season, which was rather cold. Height measurements on one field showed the plants to be 4½ feet high in the first 18 rows next to the windbreak, while beyond this protected zone the height was only 2½ feet. This luxuriant growth was still in evidence at the end of the season, and not only produced more fodder, but bigger and heavier ears. The field showed a production of 59 bushels to the acre in the protected part and only 41 bushels in the exposed part. The net gain, including the area shaded by the grove, was equivalent to the yield of a strip twice as wide as the height of the trees, which were 38 feet high. The increased yield paid, then, for a strip 76 feet wide. The windbreak hap-



pened to be wider than this, but need not have been to afford the same amount of protection.

With ordinary field crops the farmer may count on a benefit from windbreak protection which will make the loss of the area occupied by the trees negligible. Under middle western conditions a windbreak whose width does not exceed two or three times its height will more than pay for itself regardless of the timber which it may produce. Farther east the same kind of influence and benefit will exist, though in a less marked degree, and a greater direct return may be expected from growing the timber for its own value, so that the need of even a slight amount of protection should make windbreak planting attractive.

In any region the windbreak should be so laid out as to offer the greatest resistance to damaging winds and to protect the greatest area. This simply means having the belt or row at right angles to the prevailing winds.

#### Ground Space Necessary

The belt of trees forming a windbreak needs the use of a certain amount of ground beyond that on

#### THE CITRUS INDUSTRY

which it actually stands. There must be space for the roots to spread out in search of soil nourishment and moisture. It should be remembered that the row of trees is a productive agent quite as much as a row of corn and may need just as much growing space in proportion to its height. Some species of trees, of course, spread their roots wider than others and need more space. Of those commonly planted, mulberry, honey locust and osage orange spread the farthest in proportion to their height and green ash spreads the least. Cottonwood does not spread its roots so far as is generally supposed.

Cultivation tends to limit the spread of the roots by making more moisture available near the trees, though deep plowing or cutting the roots restricts the root extension at the expense of the growth of the trees themselves. On the other hand, competition between trees, where several rows are planted together, tends to make those on the outside of the belt push their roots farther out into the open ground.

The width of the strip of ground to be allowed the windbreak may be figured at from one and one-fourth to

twice the height of the trees; for instance, a single row of trees 50 feet high should be allowed a strip of ground from 62 to 100 feet wide.

#### Direct Returns From Planting

In addition to affording protection to crops and buildings, the windbreak usually has considerable value as a source of wood supply for use on the farm or for sale.

#### MEMORIAL ROADS AND REFORESTATION

(Continued from Page 19)

an interest in the upkeep of that road such as he has never evinced before.

Joyce Kilmer, who gave his life to France, paid a glorious tribute to the tree when he wrote: "I think that I shall never see a poem lovely as a tree, a tree that looks at God all day and lifts its leafy arms to pray."

The Anaheim Orange and Lemon association has bought the warehouses of the Exchange Orange Products company at Anaheim, Calif., and will use them for the storage of supplies. The fleet of trucks owned by the association will be housed in one, according to Manager G. W. Sandilands.

## Activities of Florida Development Board

The rapidly increasing production of citrus fruits and vegetables in Florida challenges the attention of business men to the necessity for providing an adequate supply of shipping crate material for the future, as the present stand of commercial timber will be exhausted within a few years.

The Florida Development Board considers reforestation of cut-over lands one of the most important problems connected with future development of the state's horticultural and agricultural resources.

The United States Forest Service has been requested to help in formulating a program which will assure re-seeding and protection of sufficient areas to supply future requirements. Control of forest fires will go a long ways toward solving the problem, and the people throughout the state should co-operate in preventing burning over of millions of acres each season.

Complaints have been received that unwarranted high prices per portion for citrus fruits have been charged in some hotels and on some dining cars, thereby discouraging consumption by the travelling public.

Some of the hotel managers also complain that they have not been able to get a dependable supply of first quality citrus fruit to serve their customers.

The Florida Development Board consulted responsible marketing agencies and has assurance that all orders from managers of hotels and dining cars, who will serve good quality Florida citrus fruit at nominal charges per portion, will be filled while fruit is in season.

That information has been conveyed to the managers of hotels in Florida and to the managers of dining cars operating on roads to northern and eastern states, asking their co-operation in not serving California citrus fruit while Florida citrus fruit is in season, and to serve first quality citrus fruit at nominal charge per portion.

A report on the fundamental soil types in Florida by the United States Bureau of Soil Survey has never been made because the work in the nine counties west of the Apalachicola river has not been completed. The Florida Development Board has urged upon the officials that the work be completed so information

can be made available. The last request was made on December 21, when assurance was given that the work will be completed as soon as possible, and on December 30 Mr. J. O. Veach, soil survey expert of the department, reported at office of the Florida Development Board that he was en route to finish making the general soil survey.

The citrus growers in Florida held a meeting in Orlando last summer and appointed a committee to ask the federal horticultural board for better protection against possibility of the black fly gaining entrance to southern states from the infested areas in Bahama Islands, Cuba and elsewhere.

A hearing was held in Washington, on December 30, which was attended by a large delegation of citrus growers from Florida. The Florida Development Board was represented by A. A. Coult, secretary, and C. S. Ucker, a member of the executive committee.

An announcement by the federal horticultural board as to its future policy on quarantines and shipping restrictions from infested areas is expected at an early date.

### PREVENTING WITHER TIP IN CITRUS TREES

What precautions do you take to prevent withertip in your citrus grove? Dr. O. F. Burger, plant pathologist of the Florida Experiment Station, says that trees affected with withertip should be pruned of infected branches and twigs. He goes further and says dead wood should be kept pruned out of all trees, whether the disease is present or not. All dead and infected limbs and twigs should be cut away. The small dead twigs in the center of the tree should be taken out. If the trees are badly affected a severe pruning may be necessary.

A clean-up spray of bordeaux mixture and oil will kill the spores still clinging to the surface of the tree after pruning. The oil is for control of purple scale. If bordeaux is used without oil or a follow-up insecticide, the scale will increase.

Keep the trees in good, healthy condition. In the spring use a fertilizer rich in plant food.

Withertip is a disease of trees in the grove, and also of young trees in the nursery. It rarely attacks trees in a healthy condition. Trees weakened by drought, cold, lack of proper food, or over-bearing, are subject to withertip.

This malady is a withering and dying back of the branches and twigs. This is generally accompanied by an exudation of gum. The young terminal branches become stained and wither; the leaves yellow and drop. The affected tree usually appears stunted and sickly.

Not only do trees show signs of disease, but the fruit also becomes marked. Sometimes small red depressions occur. At other times the affected area may be an inch or more in diameter and turn black. This disease on the fruit is generally known as anthracnose.

### PRUNING CITRUS TREES

Do you put off pruning your citrus trees? E. F. DeBusk, of the Florida Agricultural Extension Division, says that this is one of the most important phases of citrus culture and perhaps the most neglected. During the last two or three years the labor situation has been serious and many groves had to go neglected. As a result this putting off has become somewhat a habit, especially during busy seasons.

It is highly important that all groves are looked over during the winter months, and wherever pruning is necessary it should be done.

There is much melanose and some withertip scattered throughout the citrus belt. Many groves have much dead wood. Wherever dead wood appears it should be taken out and destroyed immediately. Do not leave it in the groves. Remember, dead wood in the citrus grove means disease in nearly every case.

In pruning make cuts smooth and close to the trunk or the large branch from which cut. Be sure to cut deep enough to get all dead wood. Large cuts should be painted waterproof.

Aside from cutting out watersprouts, very little green wood should be pruned from grapefruit and orange trees. The old method of pruning to admit sunlight to all branches is bad practice.

It is bad practice to prune out vigorous growth from the inside of citrus trees, especially grapefruit. These interior branches are good fruiters. Furthermore, by pruning them out wood growth and fruiting are forced to the outer branches.

In pruning citrus trees, first cut out all dead wood, and then prune lightly and very cautiously.

### DR. HARING DISCUSSES THE VITAMINS IN CITRUS FRUITS

Dr. C. M. Haring, director of the agricultural experiment station of the University of California, in writing on the subject of the importance of vitamins in food, says:

"The discovery that fruits, and especially citrus fruits, contain vitamins not only explains why we should eat fruit, but it will undoubtedly result in a greater appreciation and use of California's chief agricultural product. When the fact becomes generally known that citrus fruits and their juices contain a higher proportion of vitamins than most foods, a tremendous impetus will be given to the consumption of these products throughout this country.

"It is already known that the fresh juices of the orange, lemon and grapefruit contain the vitamins frequently spoken of as water-soluble vitamins. It is surprising to learn from the experiments on rats conducted by Prof. T. B. Osborne and Prof. L. B. Mendel that orange juice compares favorably with cow's milk in water-soluble vitamin content and that it may contain some fat-soluble vitamin. If so, it will have been demonstrated to yield all the present known types of vitamins.

"The caloric value of fruits is low. They contain no fats and very little protein. Some contain a small amount of starch and the sugar

and mineral content was believed for years to be the chief nutritive ingredient.

"The discovery of vitamins has opened up an entirely new line of investigation, the effects of which can already be foreseen. Fruits are coming to be recognized as necessities instead of luxuries, and ailments like rickets, scurvy and certain forms of ophthalmia, anaemia and skin disease are destined to banishment through a proper dietary."

### WHEN TO PRUNE CITRUS TREES

When is the best time to prune citrus trees? This question is repeatedly asked by growers, especially beginners. E. F. DeBusk, of the University of Florida Agricultural Extension Division, says do it when it is needed.

In order to get sufficient pruning done reliable help is necessary. If the laborers are unskilled, there is danger of over-pruning. When the minimum damage to fruit will result and there is least danger of transmitting disease, is probably the best time to prune.

Many growers advise winter and summer as the best times for pruning, and they are probably correct. Citrus trees are more nearly dormant during these seasons. But many growers advise against the winter season because much damage is done the fruit. If the pruning is done late in the winter, much bloom wood is removed.

If melanose or withertip are present and if any pruning is done during the summer dormant period, it should be done very carefully so as to avoid the spread of these diseases. Spores of melanose and withertip are most abundant during the warm, moist season and are at this time most vigorous in spreading and developing new infections.

Do not let dead branches come in contact with living ones in pruning and other work. Keep in mind that a dead branch is usually a hot-bed of disease. Pruning implements should be disinfected often, especially in going from one tree to another.

Professor DeBusk has given this rule concerning pruning: Practice practical caution and prudence in pruning, but prune.

Citrus growers, observe the following rules or suffer loss from stem-end rot: 1. Keep trees pruned of dead and diseased twigs and limbs; 2. Destroy old and bruised or crushed fruit; 3. Cool the fruit as quickly as possible after picking it.



Some colonies of aphycus Lounsbury, the predatory insect which it is hoped may control the black scale, are being liberated in certain Potrero Heights orchards, Los Angeles county, California, as an experiment. As climatic conditions there were found to be quite similar to those in Ventura county, where the aphycus is proving beneficial, the state insectary officials decided to try the aphycus in the orchards where the black scale has become prevalent.

The Arnold Fruit company of Jacksonville, because of the high cost of wraps, shook and packing, is shipping its grapefruit in bulk to the markets.

#### CLASSIFIED ADVERTISEMENTS

The rate for advertisements of this nature is only three cents per word for each insertion. You may count the number of words you have, multiply it by three, and you will have the cost of the advertisement for one insertion. Multiply this by the total number of insertions desired and you will have the total cost. This rate is so low that we cannot charge classified accounts, and would, therefore, appreciate a remittance with order. No advertisement accepted for less than 50 cents.

THE CITRUS INDUSTRY.  
411 Curry Bldg., Tampa, Florida

#### REAL ESTATE

FOR SALE—Tracts in famous Turnbull Hammock on Indian River, where Indian River oranges, so well known for their sweetness and fine flavor, grow. Rich soil with marl subsoil underlaid with blue clay. Pure water. Fine citrus, pecan, trucking and Irish potato land. Your correspondence solicited. C. H. Sundmacher, Box 1153, Jacksonville, Fla. Jan.-11

550 ACRES best Florida stock, fruit and vegetable land. Rail and water transportation; hard surfaced road; artesian water; improvements; store and postoffice. Priced low for quick sale. Owner Mossdale, Florida.

283 ACRE FARM six miles west of Lake City, Fla., on National highway. 120 cultivated, over 1,000 rods woven fence, good house and well; pecan grove and other improvements. Owner, R. E. Jones, Lake City, Fla., R. F. D. A. Box 35.

If you want to sell or exchange your property write me. John J. Black, 180th St., Chippewa Falls, Wis. Nov.-31

#### THE CITRUS INDUSTRY

FRUIT AND BERRY LANDS—What do you want to grow? How much land do you want and what terms? Railroad Farm Bureau, San Antonio, Tex.

CITRUS LAND—I have nearly a section of fine citrus land, well located, well protected and in a highly developed section. There is no better way to invest your money than to put out a grove and re-sell the property in ten-acre lots. If you have the money to buy four hundred acres I am in a position to fix you up at the bargain price of fifty per acre. I want to show this to you. Write for appointment. Box 216, Haines City, Fla.

FOR SALE—Florida lakefront property containing 16½ acres, 14 acres in grove eight years old as follows: Nine acres Valencia (late) orange, 5 acres grapefruit all in fine condition, 2½ acre building site on lake. This property is located in one of the finest citrus fruit sections in Florida, and fronts on beautiful lake, good elevation, one mile off hard road, 1¼ miles to good town. Grove well fruited now. Price \$17,000—only \$5,000 cash, balance in three years. H. L. Wilson, Bartow, Fla.

FOR SALE—Fine bearing grove of 5 acres and 7-room modern bungalow, in city of Arcadia on asphalt paved street; here is a modern home with income to support it in a city of 5,000 population. For particulars, address Owner, Box 667, Clearwater, Florida. Nov.-41

Ten acres good citrus land, high, well drained; Indian River section, St. Lucie county; one mile from East Coast Railway; same distance from Indian river; 500 dollars. Boon, 127 Gray Court, Birmingham, Mich.

FOR SALE—Choice California citrus lands. One dollar per acre monthly. R. B. Davy, Hayward, Calif. Nov.-21

For Sale—10 acres citrus land at Roseland, Indian river, \$50 per acre. Boon, 127 Gray Court, Birmingham, Mich.

WANTED—To hear from owner of land for sale. O. K. Hawley, Baldwin, Wisconsin. 11

For sale near Los Angeles, Calif., 15 acres of fine lemons 5 and 6 years old, fine condition, perfect tract, piped and plenty of water; 40 young walnuts along this tract. Paying and growing investment. Nothing better for \$20,000. H. S. Parker, 128 W. Broadway, Glendale, Calif. Aug.

#### SEEDS

CANE SEED—Early amber and orange. Fancy, cleaned stock, \$2.50 per bushel. Red Top, \$2.60 per bushel. Hudmon Seed Company, Nashville, Tenn.

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